

"Collimator Magnets and the Determination of the Earth's Horizontal Magnetic Force." By C. CHREE, Sc.D., LL.D., F.R.S., Superintendent of the Kew Observatory. Communicated by the KEW OBSERVATORY COMMITTEE of the Royal Society. Received May 31,—Read June 15, 1899.

(Abstract.)

During the last forty years, there have been examined at Kew Observatory upwards of 100 collimator magnets used in observing the horizontal force and declination.

The "constants" of these magnets—temperature and induction coefficients, and moment of inertia—have been determined at the Observatory, and the tables based on these determinations have served to reduce magnetic observations at a large number of the leading magnetic observatories.

The present paper deals with the data recorded in the Observatory books for the constants specified above, and with other quantities—such as the "permanent" magnetic moment—which are deducible from the records. It determines the mean values of the several quantities for the instruments of the leading English makers, and investigates whether relations do or do not exist between them. It then deduces from the records the probable errors in the values of the several quantities, proceeding on the hypothesis that the methods of determining them are correct. It next examines, from a mathematical standpoint, the accuracy of the formulæ employed in reducing horizontal force observations, and, from a physical standpoint, the possibility of differences between the quantities determined at the Observatory and the quantities actually concerned in horizontal force observations.

The various sources of uncertainty are dealt with, and an attempt is made to ascertain to what extent they may affect the values found for the horizontal force.

The results of the paper are of too technical a character to admit of their being summarized briefly in an intelligible way.

"The Thermal Expansion of Pure Nickel and Cobalt." By A. E. TUTTON, B.Sc. Communicated by Prof. TILDEN, D.Sc., F.R.S. Received April 18,—Read May 5, 1899.

The following are the numerical experimental data of the eighteen individual determinations of the coefficients of expansion of pure nickel and cobalt, referred to in the abstract previously published (p. 161, *suprà*). Full explanations of the signs employed in the tables will be found in the memoir "On the Thermal Expansion of certain Sulphates."*

* 'Phil. Trans.,' A, vol. 192, p. 455.